

## CLAIMS

1    1.(withdrawn)     A composition comprising a modified nucleotide including a molecular and/or  
2    atomic tag, where the nucleotide alters base incorporation fidelity in a nucleotide polymerizing agent  
3    relative to a base incorporation fidelity of the agent in the absence of the modified nucleotide.

1    2.(withdrawn)     The composition of claim 1, wherein the modified nucleotide comprises a  $\beta$   
2    and/or  $\gamma$  phosphate modified nucleotide.

1    3.(withdrawn)     The composition of claim 1, wherein the modified nucleotide comprises a  $\beta$   
2    phosphate modified nucleotide.

1    4.(withdrawn)     The composition of claim 1, wherein the modified nucleotide comprises a  $\gamma$   
2    phosphate modified nucleotide.

1    5.(withdrawn)     The composition of claim 4, wherein the tag comprises a molecule.

1    6.(withdrawn)     The composition of claim 5, wherein the tag is ANS.

1    7.(currently amended)     A method for using modified nucleotides to alter base incorporation  
2    fidelity comprising the step of adding a modified nucleotide including a molecular tag to a nucleotide  
3    polymerization medium comprising a nucleotide polymerizing agent, a primer and a template, where  
4    the modified nucleotide alters increases base incorporation fidelity of the nucleotide polymerizing  
5    agent relative to a base incorporation fidelity of the nucleotide polymerizing agent in the absence of  
6    the modified nucleotide to produce an extended primer having reduced incorrect base incorporations.

1    8.(original)     The method of claim 7, wherein the modified nucleotide comprises a  $\beta$  and/or  $\gamma$   
2    phosphate modified nucleotide.

1    9.(original)     The method of claim 7, wherein the modified nucleotide comprises a  $\beta$  phosphate  
2    modified nucleotide.

1 10.(original) The method of claim 7, wherein the modified nucleotide comprises a  $\gamma$  phosphate  
2 modified nucleotide.

1 11.(canceled) The method of claim 10, wherein the tag comprises a molecular tag.

1       **12.(currently amended)**     The method of claim 10, wherein the tag comprises aminonaphthalene-  
2       1-sulfonate (ANS).

1       13.(currently amended) A method for using modified nucleotides to alter base incorporation  
2       fidelity comprising the step of adding a modified nucleotide including a molecular tag to an assay  
3       for extending a nucleotide sequence, where the modified nucleotide alters base incorporation fidelity  
4       of a nucleotide polymerizing agent relative to a base incorporation fidelity of the polymerizing agent  
5       in the absence of the modified nucleotide, and the assay is selected from the group consisting of  
6       genotyping for *in vitro* reproductive methods (human and other organisms); single nucleotide  
7       polymorphism (SNP) detection; DNA sequencing; RNA sequencing; single nucleotide extension  
8       assays; amplified DNA product assays; rolling circle product assays; PCR product assays; allele-  
9       specific primer extension assays; single-molecule arrays (DNA, RNA, protein) assays; and drug  
10      toxicity evaluation assays.

1        14.(withdrawn)      A method for making blunt-ended fragments comprising the steps of  
2        amplifying a DNA fragment in the presence of a nucleotide including a molecular and/or atomic tag  
3        on a  $\gamma$  phosphate group and/or a base moiety, where the tag alters fidelity of base incorporation and  
4        decreases or eliminates non-templated addition of a base to the 3' end of the DNA fragment being  
5        amplified.

1       15.(currently amended)     A kit for performing a nucleotide polymerizing reaction comprising  
2       using at least one modified nucleotide including a molecular tag in the presence of a polymerizing  
3       agent, a primer and a template, where the modified nucleotide alters polymerizing agent extension  
4       fidelity for the at least one modified nucleotide compared to the polymerizing agent extension  
5       fidelity in the presence of the unmodified nucleotide corresponding to the at least one modified  
6       nucleotide.

1       16.(withdrawn)     A method of inhibiting or preventing pyrophosphorolysis during synthesis of  
2       a nucleic acid molecule, said method comprising

3           (a) combining a primer with a nucleic acid template under conditions sufficient to form a hybridized  
4       product; and

5           (b) incubating the hybridized product with a polymerase in the presence or absence of an enzyme  
6       selected from the group consisting of a pentosyltransferase, a phosphotransferase with alcohol group  
7       as acceptor, a nucleotidyltransferase, and a carboxy-lyase, under conditions sufficient to form a  
8       second nucleic acid molecule complementary to all or a portion of the nucleic acid template,

9               where a tagged nucleotide comprises an atomic and/or molecular tag or moiety attached to  
10      and/or associated with a  $\beta$  and/or  $\gamma$ -phosphate and/or a base moiety of the nucleotide is added at  
11      either or both steps to inhibit or prevent pyrophosphorolysis during synthesis of a nucleic acid  
12      molecule.

1       17.(withdrawn)     A composition comprising a nucleotide including a molecular and/or atomic  
2       tag on a phosphate group adapted to alter the fidelity of viral replication.

1       18.(withdrawn)     The composition of claim 17, wherein the virus is HIV.

1       19.(withdrawn)     A method for increasing the fidelity of replication comprising administering  
2       an therapeutically effective amount of a nucleotide including a molecular and/or atomic tag on a  $\gamma$   
3       phosphate group to an animal including a human, where the nucleotide is designed to increase base  
4       incorporation fidelity during replication.

1       20.(withdrawn)     The method of claim 19, wherein the replication is caused by an HIV virus.

1       21.(currently amended)     The method of claim 7, wherein the tag is-covalently bonded to the  
2       modified nucleotide through a linker.

1       22.(currently amended)     The method of claim 7, wherein the tag is covalently bonded to the  
2       modified nucleotide.

1       **23.(currently amended)**     The method of claim 10, wherein the molecular tag comprises a  
2       fluorophore selected from the group consisting of 4-acetamido-4'isothiocyanatostilbene-  
3       2,2'disulfonic acid; acridine and derivatives: acridine, acridine isothiocyanate; 5- (2'-aminoethyl)  
4       aminonaphthalene-1-sulfonic acid (EDANS); 4-amino – 3-vinylsulfonyl) phenyl] naphthalimide-3,5  
5       disulfonate; – (4-anilino-1naphthyl) maleimide; anthranilamide; BODIPY; Brilliant Yellow;  
6       coumarin and derivatives: coumarin, 7-amino-4-methylcoumarin (AMC, Coumarin 120), 7-amino-  
7       4trifluoromethylcouluarin (Coumaran 151); cyanine dyes; cyanoiline; 4', 6-diaminidino-  
8       2phenylindole (DAPI); 5', 5"-dibromopyrogallol-sulfonaphthalein (Bromopyrogallo1 Red); 7-  
9       diethylamino-3-(4'-isothiocyanatophenyl)-4-methylcoumarin; diethylenetriamine pentaacetate; 4,4'-  
10      diisothiocyanatodihydro-stilbene-2,2'-disulfonic acid; 4,4' diisothiocyanatostilbene-2,2'-disulfonic  
11      acid; 5-dimethylamino naphthalene-1-sulfonyl chloride (DNS, dansylchloride); 4-  
12      dimethylaminophenylazophenyl-4'-isothiocyanate (DABITC); eosin and derivatives: eosin, eosin  
13      isothiocyanate, erythrosin and derivatives: erythrosin B, erythrosin, isothiocyanate; ethidium;  
14      fluorescein and derivatives: 5carboxyfluorescein (FAM), 5- (4, 6-dichlorotriazin-2-yl)  
15      aminofluorescein (DTAF), 2', 7'dimethoxy-4'5'-dichloro-6-carboxyfluorescein (JOE), fluorescein,  
16      fluorescein isothiocyanate, QFITC, (XRITC); fluorescamine; IR144; IR1446; Malachite Green  
17      isothiocyanate; 4-methylumbelliferoneortho cresolphthalein; nitrotyrosine; pararosaniline; Phenol  
18      Red; B-phycoerythrin; o-phthaldialdehyde; pyrene and derivatives: pyrene, pyrene butyrate,  
19      succinimidyl 1-pyrene; butyrate quantum dots; Reactive Red 4 (CibacronTM Brilliant Red 3B-A)  
20      rhodamine and derivatives: 6-carboxy-X-rhodamine (ROX), 6carboxyrhodamine (R6G), lissamine  
21      rhodamine B sulfonyl chloride rhodamine (Rhod), rhodamine B, rhodamine 123, rhodamine X  
22      isothiocyanate, sulforhodamine B, sulforhodamine 101, sulfonyl chloride derivative of  
23      sulforhodamine 101 (Texas Red); N, N, N', N'-tetramethyl-6-carboxyrhodamine (TAMRA);  
24      tetramethyl rhodamine; tetramethyl rhodamine isothiocyanate (TRITC); riboflavin; rosolic acid;  
25      terbium chelate derivatives; Cy 3; Cy 5; Cy 5.5; Cy 7; IRD 700; IRD 800; La Jolla Blue; phthalo  
26      cyanine; and naphthalo cyanine.

1       **24.(currently amended)**     The method of claim 10, wherein the molecular tag is selected from  
2       the group consisting of alkyl groups having between 1 and 30 carbon atoms, aryl groups having  
3       between about 6 and about 40 carbon atoms, or alkaryl and aralkyl groups having between about 7

4 and about 40 carbon atoms, or mixture or combinations thereof, where the carbon atoms are replace  
5 by one or more hetero atoms in the structure provided the structure represents a stable molecular  
6 system, where the hetero atoms selected from the group consisting of P, S, Si, N, and O.

1       **25.(currently amended)**     The method of claim 10, wherein the molecular tag is selected from  
2 the group consisting of 4-aminophenol, 6-aminonaphthol, 4-nitrophenol, 6-nitronaphthol, 4-  
3 methylphenol, 6-chloronaphthol, 4-methoxyphenol, 6-bromonaphthol, 4-chlorophenol, 6-  
4 iodonaphthol, 4-bromophenol, 4, 4'-dihydroxybiphenyl, 4-iodophenol, 8-hydroxyquinoline, 4-  
5 nitronaphthol, 3-hydroxypyridine, 4-aminonaphthol, umbelliferone, 4-methylnaphthol, resorufin, 4-  
6 methoxynaphthol, 8-hydroxypyrene, 4-chloronaphthol, 9-hydroxyanthracene, 4-bromonaphthol, 6-  
7 nitro-9-hydroxyanthracene, 4-iodonaphthol, 3-hydroxyflavone, 6-methylnaphthol, fluorescein, 6-  
8 methoxynaphthol, 3-hydroxybenzoflavone, 1-hydroxy-2-propyne, 1-hydroxy-4-pentyne, 1-hydroxy-  
9 3-butyne, 1-hydroxy-5-hexyne, Methanol, Ethanol, Propanol, Isopropanol, Butanol, Tert-butanol,  
10 Hexanol, Cyclohexanol, Heptanol, Octanol, Decanol, Undecanol, Dodecanol, 1-acetoxyethanol  
11 (CH<sub>3</sub>COCH<sub>2</sub>-O-NTP), 2-acetoxyethanol, 3-acetoxypropanol, 4-acetoxybutanol, 5-acetoxypentanol,  
12 6-acetoxyhexanol, 2-nitroethanol, 3-nitropropanol, 4-nitrobutanol, 5-nitropentanol, 5-nitrohexanol,  
13 1-hydroxy-3-propene, 1-hydroxy-2-cyclohexene, 1-hydroxy-4-butene, 1-hydroxy-3-propaldehyde,  
14 1-hydroxy-5-pentene, 1-hydroxy-4-butanaldehyde, 1-hydroxy-6-hexene, 1-hydroxy-3-Butanone,  
15 Phenol, 4-methyl-3-hydroxypyridine, 4-Carboxyphenol, 5-methoxy-3-hydroxypyridine, 4-  
16 Acetoxyethylphenol, 5-nitro-3-hydroxypyridine, 4-nitrophenol, 5-acetoxyethyl-3-  
17 hydroxypyridine, 4-methylphenol, 6-methyl-8-hydroxyquinoline, 4-methoxyphenol 6-methoxy-8-  
18 hydroxyquinoline, 4-ethylphenol, 4-methyl-8-hydroxyquinoline, 4-butylphenol, 6-nitro-8-  
19 hydroxyquinoline, naphthol, 4-acetoxyethyl-8-hydroxyquinoline, 4 or 6 or 8 methylnaphthol  
20 pyrene, 4 or 6 or 8 methoxynaphthol, 6-methyl-8-hydroxypyrene, 4 or 6 or 8 nitronaphthol, 6-ethyl-  
21 8-hydroxypyrene, 4 or 6 or 8 ethylnaphthol, 6-nitro-8-hydroxypyrene, 4 or 6 or 8 butylnaphthol 6-  
22 (carboxysuccinimidylester) fluorescein, 4 or 6 or 8 acetoxyethylnaphthol, 6-carboxymethyl-2, 7-  
23 dichlorofluorescein, Methanol Cyclohexanol, 2-carboxy ethanol, 3-carboxypropanol, 4-  
24 carboxybutanol, 2-hydroxyethanol, 3-hydroxypropanol, 4-hydroxybutanol, 2-aminoethanol, 2-  
25 nitroethanol, 3-aminopropanol, 3-nitropropanol, 4-aminobutanol, and 4-nitrobutanol.

1       **26.(previously presented)** The method of claim 10, wherein the modified nucleotide is selected  
2 from the group consisting of Adenosine-5'- ( $\gamma$ -ANS) triphosphate, Guanosine-5'- ( $\gamma$ -ANS)  
3 triphosphate, Cytosine-5'- ( $\gamma$ -ANS) triphosphate, Thymidine-5'- ( $\gamma$ -ANS) triphosphate, Adenosine-  
4 5'- ( $\gamma$ -4-nitrophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-iodonaphthyl), Guanosine-5'- ( $\gamma$ -4-  
5 nitrophenyl) triphosphate, triphosphate Adenosine-5'- ( $\gamma$ -6-methylnaphthyl) triphosphate, Cytosine-  
6 5'- ( $\gamma$ -4-nitrophenyl) triphosphate, Thymidine-5'- ( $\gamma$ -4-nitrophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -6-  
7 methoxynaphthyl) triphosphate, Uracil-5'- ( $\gamma$ -4-nitrophenyl) triphosphate, 3'-azido-3'-  
8 deoxythymidine-5'- ( $\gamma$ -4-nitrophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -6-aminonaphthyl) triphosphate,  
9 3'-azido-2', 3'-dideoxythymidine-5'- ( $\gamma$ -4-nitrophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -6-  
10 nitronaphthyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'- ( $\gamma$ -4-  
11 nitrophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -6-chloronaphthyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-  
12 aminophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -6-bromonaphthyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-  
13 methylphenyl) triphosphate, Adenosine-5'- ( $\gamma$ -6-iodonaphthyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-  
14 methoxyphenyl) triphosphate, Adenosine-5'- ( $\gamma$ -4'-hydroxybiphenyl) triphosphate, Adenosine-5'- ( $\gamma$ -  
15 4-chlorophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -8-quinolyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-  
16 bromophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -3-pyridyl) triphosphate, Adenosine-5'- ( $\gamma$ -  
17 umbelliferone), Adenosine-5'- ( $\gamma$ -4-iodophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-nitronaphthyl)  
18 triphosphate, Adenosine-5'- ( $\gamma$ -resorufin) triphosphate, Adenosine-5'- ( $\gamma$ -pyrene) triphosphate,  
19 Adenosine-5'- ( $\gamma$ -4-aminonaphthyl) triphosphate, Adenosine-5'- ( $\gamma$ -anthracene) triphosphate,  
20 Adenosine-5'- ( $\Gamma$ -6-nitroanthracene) triphosphate, Adenosine-5'- ( $\gamma$ -4-methylnaphthyl) triphosphate,  
21 Adenosine-5'- ( $\gamma$ -flavonyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-methoxynaphthyl) triphosphate,  
22 Adenosine-5'- ( $\gamma$ -fluorescein) triphosphate, Adenosine-5'- ( $\gamma$ -benzoflavone) triphosphate, Adenosine-  
23 5'- ( $\gamma$ -4-chloronaphthyl) triphosphate, Adenosine-5'- ( $\gamma$ - (4-nitrophenyl)-  $\gamma'$ - (4-aminophenyl)  
24 triphosphate, Adenosine-5'- ( $\gamma$ -4-bromonaphthyl) triphosphate, Adenosine-5'- ( $\gamma$ - (4-nitrophenyl)-  
25  $\gamma'$ - (4-nitronaphthyl) triphosphate, Adenosine-5'- ( $\gamma$ -methyl) triphosphate, Adenosine-5'- ( $\gamma$ -  
26 acetoxypropyl) triphosphate, Guanosine-5'- ( $\gamma$ -methyl) triphosphate, Cytosine-5'- ( $\gamma$ -methyl)  
27 triphosphate, Adenosine-5'- ( $\gamma$ -acetoxymethyl) triphosphate (CH<sub>3</sub>0OCCH<sub>2</sub>-O-NTP), Thymidine-5'-  
28 ( $\gamma$ -methyl) triphosphate, Uracil-5'- ( $\gamma$ -methyl) triphosphate, Adenosine-5'- ( $\gamma$ -acetoxymethyl)  
29 triphosphate, 3'-azido-3'-deoxythymidine-5'- ( $\gamma$ -methyl) triphosphate, Adenosine-5'- ( $\gamma$ -  
30 acetoxymethyl) triphosphate, 3'-azido-2', 3'-dideoxythymidine-5'- ( $\gamma$ -methyl) triphosphate, Adenosine-  
31 5'- ( $\gamma$ , acetoxypentyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'- ( $\gamma$ -methyl)

32 triphosphate, Adenosine-5'- (γ- acetoxyhexyl) triphosphate, Adenosine-5'- (γ-ethyl) triphosphate,  
33 Adenosine-5'- (γ-2-nitroethyl) triphosphate, Adenosine-5'- (γ-propyl) triphosphate, Adenosine-5'-  
34 (γ-4-butyl) triphosphate, Adenosine-5'- (γ-3-nitropropyl) triphosphate, Adenosine-5'- (γ-hexyl)  
35 triphosphate, Adenosine-5'- (γ-octyl) triphosphate, Adenosine-5'- (γ-4-nitrobutyl)triphosphate,  
36 Adenosine-5'- (γ-decyl) triphosphate, Adenosine-5'- (γ-dodecyl) triphosphate, Adenosine-5'- (γ-5-  
37 nitropentyl)triphosphate, Adenosine-5'- (γ-isopropyl) triphosphate, Adenosine-5'- (γ-tert-butyl)  
38 triphosphate, Adenosine-5'- (γ-methyl)- (γ'-ethyl) triphosphate, Adenosine-5'- (γ-cyclohexyl)  
39 triphosphate, Adenosine-5'- (γ-methyl)- (γ'-propyl) triphosphate, Adenosine-5'- (γ-2-propenyl)  
40 triphosphate, Adenosine-5' (γ-3-butenyl) triphosphate, Guanosine-5'- (γ-2-propenyl) triphosphate,  
41 Adenosine-5'- (γ-4-pentenyl) triphosphate, Cytosine-5'- (γ-2-propenyl) triphosphate, Adenosine-5'-  
42 (γ-5-hexenyl) triphosphate, Thymidine-5'- (γ-2-propenyl) triphosphate, Adenosine-5'- (γ-  
43 cyclohexenyl) triphosphate, Uracil-5'- (7-2-propenyl) triphosphate, Adenosine-5'- (γ-3-  
44 propanaldehyde) triphosphate, 3'-azido-3'-deoxythymidine-5'- (γ-2-propenyl) triphosphate,  
45 Adenosine-5'- (γ-4-butanaldehyde) triphosphate, 3'-azido-2',3'-dideoxythymidine-5'- (γ-2-propenyl)  
46 triphosphate, Adenosine-5'- (γ-3-butanone) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'-  
47 (γ-2-propenyl) triphosphate, Adenosine-5'- (γ-2-propynyl) triphosphate, 3'-azido-2', 3'-  
48 dideoxythymidine-5'- (γ-2-propynyl) triphosphate, Guanosine-5'- (γ-2-propynyl) triphosphate,  
49 Cytosine-5'- (γ-2-propynyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'- (γ-2-propynyl)  
50 triphosphate Thymidine 5'- (γ-2-propynyl) triphosphate, Uracil-5'- (γ-2-propynyl) triphosphate,  
51 Adenosine-5'- (γ-3-butynyl) triphosphate, 3'-azido-3'-deoxythymidine-5'- (γ-2-propynyl)  
52 triphosphate, Adenosine-5'- (γ-4-pentynyl) triphosphate, Adenosine-5'- (γ-5-pentynyl) triphosphate,  
53 Adenosine-5'- (γ-4-phenyl) triphosphate, Adenosine-5'- (γ- (4 or 6 or 8 acetoxyethyl naphthyl)  
54 triphosphate, Guanosine-5'- (γ-4-phenyl) triphosphate, Cytosine-5'- (γ-4-phenyl) triphosphate,  
55 Adenosine-5'- (γ- (4-methylpyridyl)triphosphate, Thymidine-5'- (γ-4-phenyl) triphosphate, Uracil-5'-  
56 (γ-4-phenyl) triphosphate, Adenosine-5'- (γ- (5-methoxypyridyl)triphosphate, 3'-azido-3'-  
57 deoxythymidine-5'- (γ-4-phenyl) triphosphate, Adenosine-5'- (γ- (5-nitropyridyl)triphosphate, 3'-  
58 azido-2',3'-dideoxythymidine-5'- (γ-4-phenyl) triphosphate, Adenosine-5'- (γ- (5-  
59 acetoxyethylpyridyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'- (γ-4-phenyl)  
60 triphosphate, Adenosine-5'- (γ- (6-methyl-1-quinolyl) triphosphate, Adenosine-5'- (γ-4-  
61 carboxyphenyl) triphosphate, Adenosine-5'- (γ-(6-methoxy-1-quinolyl)triphosphate, Adenosine-5'-  
62 (γ- (4-acetoxyethyl) phenyl) triphosphate, Adenosine-5'- (γ- (4-methyl-1-quinolyl)triphosphate,

63 Adenosine-5'- ( $\gamma$ -4-nitrophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-methylphenyl)triphosphate,  
64 Adenosine-5'- ( $\gamma$ - (6-nitro-1-quinolyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-methoxyphenyl)  
65 triphosphate, Adenosine-5'- ( $\gamma$ - (4-acetoxymethylpyrenyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-  
66 ethylphenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (6-methylpyrenyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-  
67 butylphenyl) triphosphate, Adenosine 5'-( $\gamma$ -naphthyl) triphosphate, Adenosine-5'- ( $\gamma$ - (6-  
68 ethylpyrenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (4 or 6 or 8 methyl naphthyl)triphosphate, Adenosine-  
69 5'- ( $\gamma$ - (6-nitropyrenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (4 or 6 or 8 methoxynaphthyl) triphosphate,  
70 Adenosine-5'- ( $\gamma$ -6- (carboxysuccinimidyl fluorescein) triphosphate, Adenosine-5'- ( $\gamma$ - (4 or 6 or 8  
71 nitro naphthyl) triphosphate. Adenosine-5'- ( $\gamma$ -6-carboxymethyl-2, 7-dichlorofluorescein)  
72 triphosphate, Adenosine-5'- ( $\gamma$ - (4 or 6 or 8 ethyl naphthyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-phenyl)-  
73 ( $\gamma$ '-4 nitrophenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (4 or 6 or 8 butyl naphthyl)triphosphate,  
74 Adenosine-5'- ( $\gamma$ -4-phenyl)- ( $\gamma$ '-4 aminophenyl)triphosphate, Adenosine-5'- ( $\gamma$ -methyl) triphosphate,  
75 Adenosine-5'- ( $\gamma$ -3-aminopropyl) triphosphate, Guanosine-5'- ( $\gamma$ -methyl) triphosphate, Adenosine-5'-  
76 ( $\gamma$ -4-aminobutyl) triphosphate, Cytosine-5'- ( $\gamma$ -methyl) triphosphate Adenosine-5'- ( $\gamma$ -cyclohexyl)  
77 triphosphate, Thymidine-5'- ( $\gamma$ -methyl) triphosphate Adenosine-5'- ( $\gamma$ -2-carboxyethyl) triphosphate,  
78 Uracil-5'- ( $\gamma$ -methyl) triphosphate, Adenosine-5'- ( $\gamma$ -3-carboxypropyl)triphosphate, 3'-azido-3'-  
79 deoxythymidine-5'- (7-methyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-carboxybutyl) triphosphate, 3'-  
80 azido-2',3'-dideoxythymidine-5'- ( $\gamma$ -methyl) triphosphate, Adenosine-5'- ( $\gamma$ -2-hydroxyethyl)  
81 triphosphate, 2',3'-didehydro-2',3'-dideoxythymidine-5'- ( $\gamma$ -methyl)triphosphate, Adenosine-5'- ( $\gamma$ -3-  
82 hydroxypropyl) triphosphate, Adenosine-5'- ( $\gamma$ -ethyl) triphosphate, Adenosine-5'- ( $\gamma$ -propyl)  
83 triphosphate, Adenosine-5'- ( $\gamma$ -4-hydroxybutyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-butyl) triphosphate,  
84 Adenosine-5'- ( $\gamma$ -2-nitroethyl) triphosphate, Adenosine-5'- ( $\gamma$ -hexyl) triphosphate, Adenosine-5'- ( $\gamma$ -  
85 3-nitropropyl) triphosphate, Adenosine-5'- ( $\gamma$ -isopropyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-nitrobutyl)  
86 triphosphate, Adenosine-5'- ( $\gamma$ -tert-butyl) triphosphate ,Adenosine-5'- ( $\gamma$ -methyl)- ( $\gamma$ '-  
87 ethyl)triphosphate, Adenosine-5'- ( $\gamma$ -cyclohexyl) triphosphate, Adenosine-5'- ( $\gamma$ -2-  
88 aminoethyl)triphosphate, and Adenosine-5'- ( $\gamma$ -methyl)- ( $\gamma$ '-propyl) triphosphate.

1 27.(currently amended) The method of claim 13, wherein the tag is covalently bonded to the  
2 modified nucleotide through a linker.

**28.(currently amended)** The method of claim 13, wherein the tag is covalently bonded to the modified nucleotide.

**29.(previously presented)** The method of claim 13, wherein the modified nucleotide comprises a  $\beta$  and/or  $\gamma$  phosphate modified nucleotide.

**30.(previously presented)** The method of claim 13, wherein the modified nucleotide comprises a  $\beta$  phosphate modified nucleotide.

**31.(previously presented)** The method of claim 13, wherein the modified nucleotide comprises a  $\gamma$  phosphate modified nucleotide.

**32.(canceled)**

33.(canceled)

34.(canceled)

**35.(previously presented)** The method of claim 31, wherein the modified nucleotide is selected from the group consisting of Adenosine-5'- ( $\gamma$ -ANS) triphosphate, Guanosine-5'- ( $\gamma$ -ANS) triphosphate, Cytosine-5'- ( $\gamma$ -ANS) triphosphate, Thymidine-5'- ( $\gamma$ -ANS) triphosphate, Adenosine-5'- ( $\gamma$ -4-nitrophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-iodonaphthyl), Guanosine-5'- ( $\gamma$ -4-nitrophenyl) triphosphate, triphosphate Adenosine-5'- ( $\gamma$ -6-methylnaphthyl) triphosphate, Cytosine-5'- ( $\gamma$ -4-nitrophenyl) triphosphate, Thymidine-5'- ( $\gamma$ -4-nitrophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -6-methoxynaphthyl) triphosphate, Uracil-5'- ( $\gamma$ -4-nitrophenyl) triphosphate, 3'-azido-3'-deoxythymidine-5'-( $\gamma$ -4-nitrophenyl)triphosphate, Adenosine-5'- ( $\gamma$ -6-aminonaphthyl) triphosphate, 3'-azido-2', 3'-dideoxythymidine-5'- ( $\gamma$ -4- nitrophenyl)triphosphate, Adenosine-5'- ( $\gamma$ -6-nitronaphthyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'- ( $\gamma$ -4-nitrophenyl)triphosphate, Adenosine-5'- ( $\gamma$ -6-chloronaphthyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-aminophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -6-bromonaphthyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-methylphenyl) triphosphate, Adenosine-5'- ( $\gamma$ -6-iodonaphthyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-methoxyphenyl) triphosphate, Adenosine-5'- ( $\gamma$ -4'-hydroxybiphenyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-chlorophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -8-quinolyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-

16 bromophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -3-pyridyl) triphosphate, Adenosine-5'- ( $\gamma$ -  
17 umbelliferone), Adenosine-5'- ( $\gamma$ -4-iodophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-nitronaphthyl)  
18 triphosphate, Adenosine-5'- ( $\gamma$ -resorufin) triphosphate, Adenosine-5'- ( $\gamma$ -pyrene) triphosphate,  
19 Adenosine-5'- ( $\gamma$ -4-aminonaphthyl) triphosphate, Adenosine-5'- ( $\gamma$ -anthracene) triphosphate,  
20 Adenosine-5'-( $\Gamma$ -6-nitroanthracene) triphosphate, Adenosine-5'- ( $\gamma$ -4-methylnaphthyl) triphosphate,  
21 Adenosine-5'- ( $\gamma$ -flavonyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-methoxynaphthyl) triphosphate,  
22 Adenosine-5'- ( $\gamma$ -fluorescein) triphosphate, Adenosine-5'- ( $\gamma$ -benzoflavone) triphosphate, Adenosine-  
23 5'- ( $\gamma$ -4-chloronaphthyl) triphosphate, Adenosine-5'- ( $\gamma$ - (4-nitrophenyl)-  $\gamma'$ - (4-aminophenyl)  
24 triphosphate, Adenosine-5'- ( $\gamma$ -4-bromonaphthyl) triphosphate, Adenosine-5'- ( $\gamma$ - (4-nitrophenyl)-  
25  $\gamma'$ - (4-nitronaphthyl) triphosphate, Adenosine-5'- ( $\gamma$ -methyl) triphosphate, Adenosine-5'- ( $\gamma$ -  
26 acetoxypyropyl) triphosphate, Guanosine-5'- ( $\gamma$ -methyl) triphosphate, Cytosine-5'- ( $\gamma$ -methyl)  
27 triphosphate, Adenosine-5'- ( $\gamma$ -acetoxymethyl) triphosphate (CH<sub>3</sub>OOCCH<sub>2</sub>-O-NTP), Thymidine-5'-  
28 ( $\gamma$ -methyl) triphosphate, Uracil-5'- ( $\gamma$ -methyl) triphosphate, Adenosine-5'- ( $\gamma$ -acetoxethyl)  
29 triphosphate, 3'-azido-3'-deoxythymidine-5'- ( $\gamma$ -methyl) triphosphate, Adenosine-5'- ( $\gamma$ -  
30 acetoxypybutyl) triphosphate, 3'-azido-2', 3'-dideoxythymidine-5'- ( $\gamma$ -methyl) triphosphate, Adenosine-  
31 5'- ( $\gamma$ , acetoxypentyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'- ( $\gamma$ -methyl)  
32 triphosphate, Adenosine-5'- ( $\gamma$ -acetoxylhexyl) triphosphate, Adenosine-5'- ( $\gamma$ -ethyl) triphosphate,  
33 Adenosine-5'- ( $\gamma$ -2-nitroethyl) triphosphate, Adenosine-5'- ( $\gamma$ -propyl) triphosphate, Adenosine-5'-  
34 ( $\gamma$ -4-butyl) triphosphate, Adenosine-5'- ( $\gamma$ -3-nitropropyl) triphosphate, Adenosine-5'- ( $\gamma$ -hexyl)  
35 triphosphate, Adenosine-5'- ( $\gamma$ -octyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-nitrobutyl) triphosphate,  
36 Adenosine-5'- ( $\gamma$ -decyl) triphosphate, Adenosine-5'- ( $\gamma$ -dodecyl) triphosphate, Adenosine-5'- ( $\gamma$ -5-  
37 nitropentyl) triphosphate, Adenosine-5'- ( $\gamma$ -isopropyl) triphosphate, Adenosine-5'- ( $\gamma$ -tert-butyl)  
38 triphosphate, Adenosine-5'- ( $\gamma$ -methyl)- ( $\gamma'$ -ethyl) triphosphate, Adenosine-5'- ( $\gamma$ -cyclohexyl)  
39 triphosphate, Adenosine-5'- ( $\gamma$ -methyl)- ( $\gamma'$ -propyl) triphosphate, Adenosine-5'- ( $\gamma$ -2-propenyl)  
40 triphosphate, Adenosine-5'- ( $\gamma$ -3-but enyl) triphosphate, Guanosine-5'- ( $\gamma$ -2-propenyl) triphosphate,  
41 Adenosine-5'- ( $\gamma$ -4-pentenyl) triphosphate, Cytosine-5'- ( $\gamma$ -2-propenyl) triphosphate, Adenosine-5'-  
42 ( $\gamma$ -5-hexenyl) triphosphate, Thymidine-5'- ( $\gamma$ -2-propenyl) triphosphate, Adenosine-5'- ( $\gamma$ -  
43 cyclohexenyl) triphosphate, Uracil-5'- (7-2-propenyl) triphosphate, Adenosine-5'- ( $\gamma$ -3-  
44 propanaldehyde) triphosphate, 3'-azido-3'-deoxythymidine-5'- ( $\gamma$ -2-propenyl) triphosphate,  
45 Adenosine-5'- ( $\gamma$ -4-butanaldehyde) triphosphate, 3'-azido-2', 3'-dideoxythymidine-5'- ( $\gamma$ -2-propenyl)  
46 triphosphate, Adenosine-5'- ( $\gamma$ -3-butanone) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'-

( $\gamma$ -2-propenyl) triphosphate, Adenosine-5'- ( $\gamma$ -2-propynyl) triphosphate, 3'-azido-2', 3'-dideoxythymidine-5'- ( $\gamma$ -2-propynyl) triphosphate, Guanosine-5'- ( $\gamma$ -2-propynyl) triphosphate, Cytosine-5'- ( $\gamma$ -2-propynyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'- ( $\gamma$ -2-propynyl) triphosphate Thymidine 5'- ( $\gamma$ -2-propynyl) triphosphate, Uracil-5'- ( $\gamma$ -2-propynyl) triphosphate, Adenosine-5'- ( $\gamma$ -3-butynyl) triphosphate, 3'-azido-3'-deoxythymidine-5'- ( $\gamma$ -2-propynyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-pentynyl) triphosphate, Adenosine-5'- ( $\gamma$ -5-pentynyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-phenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (4 or 6 or 8 acetoxymethyl naphthyl) triphosphate, Guanosine-5'- ( $\gamma$ -4-phenyl) triphosphate, Cytosine-5'- ( $\gamma$ -4-phenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (4-methylpyridyl)triphosphate, Thymidine-5'- ( $\gamma$ -4-phenyl) triphosphate, Uracil-5'- ( $\gamma$ -4-phenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (5-methoxypyridyl)triphosphate, 3'-azido-3'-dideoxythymidine-5'- ( $\gamma$ -4-phenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (5-nitropyridyl)triphosphate, 3'-azido-2', 3'-dideoxythymidine-5'- ( $\gamma$ -4-phenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (5-acetoxymethylpyridyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'- ( $\gamma$ -4-phenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (6-methyl-1-quinolyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-carboxyphenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (6-methoxy-1-quinolyl)triphosphate, Adenosine-5'- ( $\gamma$ - (4-acetoxymethyl) phenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (4-methyl-1-quinolyl)triphosphate, Adenosine-5'- ( $\gamma$ -4-nitrophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-methylphenyl)triphosphate, Adenosine-5'- ( $\gamma$ - (6-nitro-1-quinolyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-methoxyphenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (4-acetoxymethylpyrenyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-ethylphenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (6-methylpyrenyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-butylphenyl) triphosphate, Adenosine 5'- ( $\gamma$ -naphthyl) triphosphate, Adenosine-5'- ( $\gamma$ - (6-ethylpyrenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (4 or 6 or 8 methyl naphthyl)triphosphate, Adenosine-5'- ( $\gamma$ - (6-nitropyrenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (4 or 6 or 8 methoxynaphthyl) triphosphate, Adenosine-5'- ( $\gamma$ -6- (carboxysuccinimidyl fluorescein) triphosphate, Adenosine-5'- ( $\gamma$ - (4 or 6 or 8 nitro naphthyl) triphosphate. Adenosine-5'- ( $\gamma$ -6-carboxymethyl-2, 7-dichlorofluorescein) triphosphate, Adenosine-5'- ( $\gamma$ - (4 or 6 or 8 ethyl naphthyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-phenyl)- ( $\gamma$ '-4 nitrophenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (4 or 6 or 8 butyl naphthyl)triphosphate, Adenosine-5'- ( $\gamma$ -4-phenyl)- ( $\gamma$ '-4 aminophenyl)triphosphate, Adenosine-5'- ( $\gamma$ -methyl) triphosphate, Adenosine-5'- ( $\gamma$ -3-aminopropyl) triphosphate, Guanosine-5'- ( $\gamma$ -methyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-aminobutyl) triphosphate, Cytosine-5'- ( $\gamma$ -methyl) triphosphate Adenosine-5'- ( $\gamma$ -cyclohexyl) triphosphate, Thymidine-5'- ( $\gamma$ -methyl) triphosphate Adenosine-5'- ( $\gamma$ -2-carboxyethyl) triphosphate,

78 Uracil-5'- ( $\gamma$ -methyl) triphosphate, Adenosine-5'- ( $\gamma$ -3-carboxypropyl)triprophosphate, 3'-azido-3'-  
79 deoxythymidine-5'- (7-methyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-carboxybutyl) triphosphate, 3'-  
80 azido-2',3'-dideoxythymidine-5'- ( $\gamma$ -methyl) triphosphate, Adenosine-5'- ( $\gamma$ -2-hydroxyethyl)  
81 triphosphate, 2',3'-didehydro-2',3'-dideoxythymidine-5'-( $\gamma$ -methyl)triprophosphate, Adenosine-5'- ( $\gamma$ -3-  
82 hydroxypropyl) triphosphate, Adenosine-5'- ( $\gamma$ -ethyl) triphosphate, Adenosine-5'- ( $\gamma$ -propyl)  
83 triphosphate, Adenosine-5'- ( $\gamma$ -4-hydroxybutyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-butyl) triphosphate,  
84 Adenosine-5'- ( $\gamma$ -2-nitroethyl) triphosphate, Adenosine-5'- ( $\gamma$ -hexyl) triphosphate, Adenosine-5'- ( $\gamma$ -  
85 3-nitropropyl) triphosphate, Adenosine-5'- ( $\gamma$ -isopropyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-nitrobutyl)  
86 triphosphate, Adenosine-5'- ( $\gamma$ -tert-butyl) triphosphate ,Adenosine-5'- ( $\gamma$ -methyl)- ( $\gamma'$ -  
87 ethyl)triprophosphate, Adenosine-5'- ( $\gamma$ -cyclohexyl) triphosphate, Adenosine-5'- ( $\gamma$ -2-  
88 aminoethyl)triprophosphate, and Adenosine-5'- ( $\gamma$ -methyl)- ( $\gamma'$ -propyl) triphosphate.

1       **36.(previously presented)**   The method of claim 7, wherein the polymerizing agent is selected  
2       from the group consisting of naturally occurring or synthetic polymerases and reverse transcriptases.

1       **37.(previously presented)**   The method of claim 13, wherein the polymerizing agent is selected  
2       from the group consisting of naturally occurring or synthetic polymerases and reverse transcriptases.

1       **38.(currently amended)**   The kit of claim 15, wherein the tag is covalently bonded to the  
2       modified nucleotide through a linker.

1       **39.(currently amended)**   The kit of claim 15, wherein the tag is covalently bonded to the  
2       modified nucleotide.

1       **40.(previously presented)**   The kit of claim 15, wherein the modified nucleotide comprises a  $\beta$   
2       and/or  $\gamma$  phosphate modified nucleotide.

1       **41.(previously presented)**   The kit of claim 15, wherein the modified nucleotide comprises a  $\beta$   
2       phosphate modified nucleotide.

1       **42.(previously presented)** The kit of claim 15, wherein the modified nucleotide comprises a  $\gamma$   
2       phosphate modified nucleotide.

1       **43.(previously presented)** The kit of claim 39, wherein the molecular tag comprises a  
2       fluorophore selected from the group consisting of 4-acetamido-4'isothiocyanatostilbene-  
3       2,2'disulfonic acid; acridine and derivatives: acridine, acridine isothiocyanate; 5- (2'-aminoethyl)  
4       aminonaphthalene-1-sulfonic acid (EDANS); 4-amino – 3-vinylsulfonyl phenyl] naphthalimide-3,5  
5       disulfonate; – (4-anilino-lnaphthyl) maleimide; anthranilamide; BODIPY; Brilliant Yellow;  
6       coumarin and derivatives: coumarin, 7-amino-4-methylcoumarin (AMC, Coumarin 120), 7-amino-  
7       4trifluoromethylcouluarin (Coumaran 151); cyanine dyes; cyanosine; 4', 6-diaminidino-  
8       2phenylindole (DAPI); 5', 5"-dibromopyrogallol-sulfonaphthalein (Bromopyrogallol Red); 7-  
9       diethylamino-3- (4'-isothiocyanatophenyl)-4-methylcoumarin; diethylenetriamine pentaacetate; 4,4'-  
10      diisothiocyanatodihydro-stilbene-2,2'-disulfonic acid; 4,4' diisothiocyanatostilbene-2,2'-disulfonic  
11      acid; 5-dimethylamino naphthalene-1-sulfonyl chloride (DNS, dansylchloride); 4-  
12      dimethylaminophenylazophenyl-4'-isothiocyanate (DABITC); eosin and derivatives: eosin, eosin  
13      isothiocyanate, erythrosin and derivatives: erythrosin B, erythrosin, isothiocyanate; ethidium;  
14      fluorescein and derivatives: 5carboxyfluorescein (FAM), 5- (4, 6-dichlorotriazin-2-yl)  
15      aminofluorescein (DTAF), 2', 7'dimethoxy-4'5'-dichloro-6-carboxyfluorescein (JOE), fluorescein,  
16      fluorescein isothiocyanate, QFITC, (XRITC); fluorescamine; IR144; IR1446; Malachite Green  
17      isothiocyanate; 4-methylumbelliferoneortho cresolphthalein; nitrotyrosine; pararosaniline; Phenol  
18      Red; B-phycoerythrin; o-phthaldialdehyde; pyrene and derivatives: pyrene, pyrene butyrate,  
19      succinimidyl 1-pyrene; butyrate quantum dots; Reactive Red 4 (CibacronTM Brilliant Red 3B-A)  
20      rhodamine and derivatives: 6-carboxy-X-rhodamine (ROX), 6carboxyrhodamine (R6G), lissamine  
21      rhodamine B sulfonyl chloride rhodamine (Rhod), rhodamine B, rhodamine 123, rhodamine X  
22      isothiocyanate, sulforhodamine B, sulforhodamine 101, sulfonyl chloride derivative of  
23      sulforhodamine 101 (Texas Red); N, N, N', N'-tetramethyl-6-carboxyrhodamine (TAMRA);  
24      tetramethyl rhodamine; tetramethyl rhodamine isothiocyanate (TRITC); riboflavin; rosolic acid;  
25      terbium chelate derivatives; Cy 3; Cy 5; Cy 5.5; Cy 7; IRD 700; IRD 800; La Jolla Blue; phthalo  
26      cyanine; and naphthalo cyanine.

1       **44.(previously presented)**   The kit of claim 39, wherein the molecular tag is selected from the  
2       group consisting of alkyl groups having between 1 and 30 carbon atoms, aryl groups having between  
3       about 6 and about 40 carbon atoms, or alkaryl and aralkyl groups having between about 7 and about  
4       40 carbon atoms, or mixture or combinations thereof, where the carbon atoms are replace by one or  
5       more hetero atoms in the structure provided the structure represents a stable molecular system, where  
6       the hetero atoms selected from the group consisting of P, S, Si, N, and O.

1       **45.(previously presented)**   The kit of claim 39, wherein the molecular tag is selected from the  
2       group consisting of 4-aminophenol, 6-aminonaphthol, 4-nitrophenol, 6-nitronaphthol, 4-  
3       methylphenol, 6-chloronaphthol, 4-methoxyphenol, 6-bromonaphthol, 4-chlorophenol, 6-  
4       iodonaphthol, 4-bromophenol, 4, 4'-dihydroxybiphenyl, 4-iodophenol, 8-hydroxyquinoline, 4-  
5       nitronaphthol, 3-hydroxypyridine, 4-aminonaphthol, umbelliferone, 4-methylnaphthol, resorufin, 4-  
6       methoxynaphthol, 8-hydroxypyrene, 4-chloronaphthol, 9-hydroxyanthracene, 4-bromonaphthol, 6-  
7       nitro-9-hydroxyanthracene, 4-iodonaphthol, 3-hydroxyflavone, 6-methylnaphthol, fluorescein, 6-  
8       methoxynaphthol, 3-hydroxybenzoflavone, 1-hydroxy-2-propyne, 1-hydroxy-4-pentyne, 1-hydroxy-  
9       3-butyne, 1-hydroxy-5-hexyne, Methanol, Ethanol, Propanol, Isopropanol, Butanol, Tert-butanol,  
10      Hexanol, Cyclohexanol, Heptanol, Octanol, Decanol, Undecanol, Dodecanol, 1-acetoxymethanol  
11      (CH30OCCH2-O-NTP), 2-acetoxyethanol, 3-acetoxypropanol, 4-acetoxybutanol, 5-acetoxypentanol,  
12      6-acetoxyhexanol, 2-nitroethanol, 3-nitropropanol, 4-nitrobutanol, 5-nitropentanol, 5-nitrohexanol,  
13      1-hydroxy-3-propene, 1-hydroxy-2-cyclohexene, 1-hydroxy-4-butene, 1-hydroxy-3-propaldehyde,  
14      1-hydroxy-5-pentene, 1-hydroxy-4-butanaldehyde, 1-hydroxy-6-hexene, 1-hydroxy-3-Butanone,  
15      Phenol, 4-methyl-3-hydroxypyridine, 4-Carboxyphenol, 5-methoxy-3-hydroxypyridine, 4-  
16      Acetoxymethylphenol, 5-nitro-3-hydroxypyridine, 4-nitrophenol, 5-acetoxymethyl-3-  
17      hydroxypyridine, 4-methylphenol, 6-methyl-8-hydroxyquinoline, 4-methoxyphenol 6-methoxy-8-  
18      hydroxyquinoline, 4-ethylphenol, 4-methyl-8-hydroxyquinoline, 4-butylphenol, 6-nitro-8-  
19      hydroxyquinoline, naphthol, 4-acetoxymethyl-8-hydroxyquinoline, 4 or 6 or 8 methylnaphthol  
20      pyrene, 4 or 6 or 8 methoxynaphthol, 6-methyl-8-hydroxypyrene, 4 or 6 or 8 nitronaphthol, 6-ethyl-  
21      8-hydroxypyrene, 4 or 6 or 8 ethylnaphthol, 6-nitro-8-hydroxypyrene, 4 or 6 or 8 butylnaphthol 6-  
22      (carboxysuccinimidylester) fluorescein, 4 or 6 or 8 acetoxymethylnaphthol, 6-carboxymethyl-2, 7-  
23      dichlorofluorescein, Methanol Cyclohexanol, 2-carboxy ethanol, 3-carboxypropanol, 4-

24 carboxybutanol, 2-hydroxyethanol, 3-hydroxypropanol, 4-hydroxybutanol, 2-aminoethanol, 2-  
25 nitroethanol, 3-aminopropanol, 3-nitropropanol, 4-aminobutanol, and 4-nitrobutanol.

1       46.(previously presented)   The kit of claim 42, wherein the modified nucleotide is selected from  
2       the group consisting of Adenosine-5'- ( $\gamma$ -ANS) triphosphate, Guanosine-5'- ( $\gamma$ -ANS) triphosphate,  
3       Cytosine-5'- ( $\gamma$ -ANS) triphosphate, Thymidine-5'- ( $\gamma$ -ANS) triphosphate, Adenosine-5'- ( $\gamma$ -4-  
4       nitrophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-iodonaphthyl), Guanosine-5'- ( $\gamma$ -4-nitrophenyl)  
5       triphosphate, triphosphate Adenosine-5'- ( $\gamma$ -6-methylnaphthyl) triphosphate, Cytosine-5'- ( $\gamma$ -4-  
6       nitrophenyl) triphosphate, Thymidine-5'- ( $\gamma$ -4-nitrophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -6-  
7       methoxynaphthyl) triphosphate, Uracil-5'- ( $\gamma$ -4-nitrophenyl) triphosphate, 3'-azido-3'-  
8       deoxythymidine-5'-( $\gamma$ -4-nitrophenyl)triphosphate, Adenosine-5'- ( $\gamma$ -6-aminonaphthyl) triphosphate,  
9       3'-azido-2', 3'-dideoxythymidine-5'- ( $\gamma$ -4- nitrophenyl)triphosphate, Adenosine-5'- ( $\gamma$ -6-  
10      nitronaphthyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'- ( $\gamma$ -4-  
11      nitrophenyl)triphosphate, Adenosine-5'- ( $\gamma$ -6-chloronaphthyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-  
12      aminophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -6-bromonaphthyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-  
13      methylphenyl) triphosphate, Adenosine-5'- ( $\gamma$ -6-iodonaphthyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-  
14      methoxyphenyl) triphosphate, Adenosine-5'-( $\gamma$ -4'-hydroxybiphenyl) triphosphate, Adenosine-5'- ( $\gamma$ -  
15      4-chlorophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -8-quinolyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-  
16      bromophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -3-pyridyl) triphosphate, Adenosine-5'- ( $\gamma$ -  
17      umbelliferone), Adenosine-5'- ( $\gamma$ -4-iodophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-nitronaphthyl)  
18      triphosphate, Adenosine-5'- ( $\gamma$ -resorufin) triphosphate, Adenosine-5'- ( $\gamma$ -pyrene) triphosphate,  
19      Adenosine-5'- ( $\gamma$ -4-aminonaphthyl) triphosphate, Adenosine-5'- ( $\gamma$ -anthracene) triphosphate,  
20      Adenosine-5'-( $\Gamma$ -6-nitroanthracene)triphosphate, Adenosine-5'- ( $\gamma$ -4-methylnaphthyl)triphosphate,  
21      Adenosine-5'- ( $\gamma$ -flavonyl) triphosphate, Adenosine-5'-( $\gamma$ -4-methoxynaphthyl) triphosphate,  
22      Adenosine-5'-( $\gamma$ -fluorescein)triphosphate, Adenosine-5'- ( $\gamma$ -benzoflavone)triphosphate, Adenosine-  
23      5'- ( $\gamma$ -4-chloronaphthyl) triphosphate, Adenosine-5'- ( $\gamma$ - (4-nitrophenyl)-  $\gamma'$ - (4-aminophenyl)  
24      triphosphate, Adenosine-5'- ( $\gamma$ -4-bromonaphthyl) triphosphate, Adenosine-5'- ( $\gamma$ - (4-nitrophenyl)-  
25       $\gamma'$ - (4-nitronaphthyl) triphosphate, Adenosine-5'- ( $\gamma$ -methyl) triphosphate, Adenosine-5'- ( $\gamma$ -  
26      acetoxypropyl)triphosphate, Guanosine-5'- ( $\gamma$ -methyl) triphosphate, Cytosine-5'- ( $\gamma$ -methyl)  
27      triphosphate, Adenosine-5'- ( $\gamma$ -acetoxymethyl)triphosphate(CH30OCCH,-O-NTP), Thymidine-5'-  
28      ( $\gamma$ -methyl) triphosphate, Uracil-5'- ( $\gamma$ -methyl) triphosphate, Adenosine-5'-( $\gamma$ -acetoxethyl)

29 triphosphate, 3'-azido-3'-deoxythymidine-5-( $\gamma$ -methyl)triphosphate, Adenosine-5'- ( $\gamma$ -  
30 acetoxybutyl)triphosphate, 3'-azido-2', 3'-dideoxythymidine-5'- ( $\gamma$ -methyl) triphosphate, Adenosine-  
31 5'- ( $\gamma$ , acetoxypentyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'- ( $\gamma$ -methyl)  
32 triphosphate, Adenosine-5'- ( $\gamma$ - acetoxyhexyl) triphosphate, Adenosine-5'- ( $\gamma$ -ethyl) triphosphate,  
33 Adenosine-5'- ( $\gamma$ -2-nitroethyl) triphosphate, Adenosine-5'- ( $\gamma$ -propyl) triphosphate, Adenosine-5'-  
34 ( $\gamma$ -4-butyl) triphosphate, Adenosine-5'- ( $\gamma$ -3-nitropropyl) triphosphate, Adenosine-5'- ( $\gamma$ -hexyl)  
35 triphosphate, Adenosine-5'- ( $\gamma$ -octyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-nitrobutyl)triphosphate,  
36 Adenosine-5'- ( $\gamma$ -decyl) triphosphate, Adenosine-5'- ( $\gamma$ -dodecyl) triphosphate, Adenosine-5'- ( $\gamma$ -5-  
37 nitropentyl)triphosphate, Adenosine-5'- ( $\gamma$ -isopropyl) triphosphate, Adenosine-5'- ( $\gamma$ -tert-butyl)  
38 triphosphate, Adenosine-5'- ( $\gamma$ -methyl)- ( $\gamma'$ -ethyl) triphosphate, Adenosine-5'- ( $\gamma$ -cyclohexyl)  
39 triphosphate, Adenosine-5'- ( $\gamma$ -methyl)- ( $\gamma'$ -propyl) triphosphate, Adenosine-5'- ( $\gamma$ -2-propenyl)  
40 triphosphate, Adenosine-5'- ( $\gamma$ -3-butenyl) triphosphate, Guanosine-5'- ( $\gamma$ -2-propenyl) triphosphate,  
41 Adenosine-5'- ( $\gamma$ -4-pentenyl) triphosphate, Cytosine-5'- ( $\gamma$ -2-propenyl) triphosphate, Adenosine-5'-  
42 ( $\gamma$ -5-hexenyl) triphosphate, Thymidine-5'- ( $\gamma$ -2-propenyl) triphosphate, Adenosine-5'- ( $\gamma$ -  
43 cyclohexenyl) triphosphate, Uracil-5'- (7-2-propenyl) triphosphate, Adenosine-5'- ( $\gamma$ -3-  
44 propanaldehyde) triphosphate, 3'-azido-3'-deoxythymidine-5'- ( $\gamma$ -2-propenyl) triphosphate,  
45 Adenosine-5'-( $\gamma$ -4-butanaldehyde) triphosphate, 3'-azido-2',3'-dideoxythymidine-5'- ( $\gamma$ -2-propenyl)  
46 triphosphate, Adenosine-5'- ( $\gamma$ -3-butanone) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'-  
47 ( $\gamma$ -2-propenyl) triphosphate, Adenosine-5'- ( $\gamma$ -2-propynyl) triphosphate, 3'-azido-2', 3'-  
48 dideoxythymidine-5'- ( $\gamma$ -2-propynyl) triphosphate, Guanosine-5'- ( $\gamma$ -2-propynyl) triphosphate,  
49 Cytosine-5'- ( $\gamma$ -2-propynyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'- ( $\gamma$ -2-propynyl)  
50 triphosphate Thymidine 5'- ( $\gamma$ -2-propynyl) triphosphate, Uracil-5'- ( $\gamma$ -2-propynyl) triphosphate,  
51 Adenosine-5'- ( $\gamma$ -3-butynyl) triphosphate, 3'-azido-3'-deoxythymidine-5'- ( $\gamma$ -2-propynyl)  
52 triphosphate, Adenosine-5'- ( $\gamma$ -4-pentynyl) triphosphate, Adenosine-5'- ( $\gamma$ -5-pentynyl) triphosphate,  
53 Adenosine-5'- ( $\gamma$ -4-phenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (4 or 6 or 8 acetoxyethyl naphthyl)  
54 triphosphate, Guanosine-5'- ( $\gamma$ -4-phenyl) triphosphate, Cytosine-5'- ( $\gamma$ -4-phenyl) triphosphate,  
55 Adenosine-5'- ( $\gamma$ - (4-methylpyridyl)triphosphate, Thymidine-5'- ( $\gamma$ -4-phenyl) triphosphate, Uracil-5'-  
56 ( $\gamma$ -4-phenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (5-methoxypyridyl)triphosphate, 3'-azido-3'-  
57 deoxythymidine-5'- ( $\gamma$ -4-phenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (5-nitropyridyl)triphosphate, 3'-  
58 azido-2',3'-dideoxythymidine-5'- ( $\gamma$ -4-phenyl) triphosphate, Adenosine-5'- ( $\gamma$ -  
59 (5-acetoxyethylpyridyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'- ( $\gamma$ -4-phenyl)

60 triphosphate, Adenosine-5'- ( $\gamma$ - (6-methyl-1-quinolyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-  
61 carboxyphenyl) triphosphate, Adenosine-5'-( $\gamma$ -(6-methoxy-1-quinolyl)triphosphate, Adenosine-5'-  
62 ( $\gamma$ - (4-acetoxymethyl) phenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (4-methyl-1-quinolyl)triphosphate,  
63 Adenosine-5'- ( $\gamma$ -4-nitrophenyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-methylphenyl)triphosphate,  
64 Adenosine-5'- ( $\gamma$ - (6-nitro-1-quinolyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-methoxyphenyl)  
65 triphosphate, Adenosine-5'- ( $\gamma$ - (4-acetoxymethylpyrenyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-  
66 ethylphenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (6-methylpyrenyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-  
67 butylphenyl) triphosphate, Adenosine 5'-( $\gamma$ -naphthyl) triphosphate, Adenosine-5'- ( $\gamma$ - (6-  
68 ethylpyrenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (4 or 6 or 8 methyl naphthyl)triphosphate, Adenosine-  
69 5'- ( $\gamma$ - (6-nitropyrenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (4 or 6 or 8 methoxynaphthyl) triphosphate,  
70 Adenosine-5'- ( $\gamma$ -6- (carboxysuccinimidyl fluorescein) triphosphate, Adenosine-5'- ( $\gamma$ - (4 or 6 or 8  
71 nitro naphthyl) triphosphate. Adenosine-5'- ( $\gamma$ -6-carboxymethyl-2, 7-dichlorofluorescein)  
72 triphosphate, Adenosine-5'- ( $\gamma$ - (4 or 6 or 8 ethyl naphthyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-phenyl)-  
73 ( $\gamma$ '-4 nitrophenyl) triphosphate, Adenosine-5'- ( $\gamma$ - (4 or 6 or 8 butyl naphthyl)triphosphate,  
74 Adenosine-5'- ( $\gamma$ -4-phenyl)- ( $\gamma$ '-4 aminophenyl)triphosphate, Adenosine-5'- ( $\gamma$ -methyl) triphosphate,  
75 Adenosine-5'- ( $\gamma$ -3-aminopropyl) triphosphate, Guanosine-5'- ( $\gamma$ -methyl) triphosphate, Adenosine-5'-  
76 ( $\gamma$ -4-aminobutyl) triphosphate, Cytosine-5'- ( $\gamma$ -methyl) triphosphate Adenosine-5'- ( $\gamma$ -cyclohexyl)  
77 triphosphate, Thymidine-5'- ( $\gamma$ -methyl) triphosphate Adenosine-5'- ( $\gamma$ -2-carboxyethyl) triphosphate,  
78 Uracil-5'- ( $\gamma$ -methyl) triphosphate, Adenosine-5'- ( $\gamma$ -3-carboxypropyl)triphosphate, 3'-azido-3'-  
79 deoxythymidine-5'- (7-methyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-carboxybutyl) triphosphate, 3'-  
80 azido-2',3'-dideoxythymidine-5'- ( $\gamma$ -methyl) triphosphate, Adenosine-5'- ( $\gamma$ -2-hydroxyethyl)  
81 triphosphate, 2',3'-didehydro-2',3'-dideoxythymidine-5'-( $\gamma$ -methyl)triphosphate, Adenosine-5'- ( $\gamma$ -3-  
82 hydroxypropyl) triphosphate, Adenosine-5'- ( $\gamma$ -ethyl) triphosphate, Adenosine-5'- ( $\gamma$ -propyl)  
83 triphosphate, Adenosine-5'- ( $\gamma$ -4-hydroxybutyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-butyl) triphosphate,  
84 Adenosine-5'- ( $\gamma$ -2-nitroethyl) triphosphate, Adenosine-5'- ( $\gamma$ -hexyl) triphosphate, Adenosine-5'- ( $\gamma$ -  
85 3-nitropropyl) triphosphate, Adenosine-5'- ( $\gamma$ -isopropyl) triphosphate, Adenosine-5'- ( $\gamma$ -4-nitrobutyl)  
86 triphosphate, Adenosine-5'- ( $\gamma$ -tert-butyl) triphosphate ,Adenosine-5'- ( $\gamma$ -methyl)- ( $\gamma$ '-  
87 ethyl)triphosphate, Adenosine-5'- ( $\gamma$ -cyclohexyl) triphosphate, Adenosine-5'- ( $\gamma$ -2-  
88 aminoethyl)triphosphate, and Adenosine-5'- ( $\gamma$ -methyl)- ( $\gamma$ '-propyl) triphosphate.

1       **47.(previously presented)**   The kit of claim 15, wherein the polymerizing agent is selected from  
2       the group consisting of naturally occurring or synthetic polymerases and reverse transcriptases.